

## **REMARKS**

This is a full and timely response to the FINAL Office Action mailed February 16, 2006. Claims 1-22 remain pending. Applicant respectfully submits that claims 1-22 are clearly in condition for allowance for at least the reasons described below. Indeed, Applicant presents the following remarks in an effort to further point out distinctions to the Examiner at this time, in hopes of avoiding an unnecessary appeal process for this case. The accompanying remarks are necessary in light of the position taken in the Final Office Action. The remarks set forth herein further clarify and distinguish claimed embodiments over the cited art.

### **Response To Objections To Specification**

The disclosure was objected to for an informality. Applicant has amended the specification to address and overcome this objection.

### **Response To Objections To Claims**

Claims 1-22 were objected to for an informality. Applicant has amended the claims to address and overcome this objection. Reconsideration and withdrawal of any objection to the claims are respectfully requested.

### **Response To Claim Rejections Under 35 U.S.C §103**

Claims 1, 2, 6-9, 12-16, 18, 19, and 22 stand rejected under 35 U.S.C. 103(a) as allegedly unpatentable over Zhaoning Yu, et al (CLEO '99). This rejection is respectfully traversed.

It is well established at law that, for a proper rejection of a claim under 35 U.S.C. §103 as being obvious based upon a single reference, the reference must disclose, teach, or suggest,

either implicitly or explicitly, all elements/features/steps of the claim at issue. *See, e.g., In Re Dow Chemical*, 5 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1988), and *In re Keller*, 208 U.S.P.Q.2d 871, 881 (C.C.P.A. 1981).

The Office Action alleges that Yu et al (CLEO '99) discloses the transmissive wire grid polarizer substantially as claimed. Applicant respectfully disagrees. While Applicant does agree that some of the light must be transmitted through the polarizer of Yu et al; a full spectrum polarizer must meet the following two requirements:

1. Significant intensity variation (namely, extinction ratio) between TM and TE polarized lights:

For a reflective polarizer, it requires significant intensity variation between reflected TM light and TE light. For example, the reflectance of TE light is much higher than that of TM light, or vice versa. For a transmissive polarizer, it requires significant intensity variation between transmitted TM light and TE light.

2. Workable for full visible light spectrum (e.g., 400-700nm):

The reflective polarizer of Yu et al only shows a bandwidth for the wavelengths over 500nm but not for the entire visible light spectrum. Referring to FIG. 1 below, which is a simulation, indicate that the structure of Yu et al is not applicable to blue light region. The reflectance of TM light is even lower than that of TE light. Indeed, Fig. 3(b) of Appl. Phys. Lett., 77(7) also evidences that the polarizer of Yu et al is only workable for a bandwidth between 600-650nm.

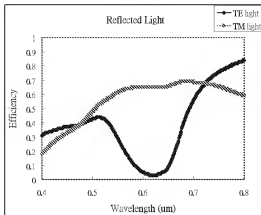


FIG. 1: the relationship between wavelength and reflectance for TM and TE polarized lights for simulation of Yu et al's structure as a reflective polarizer

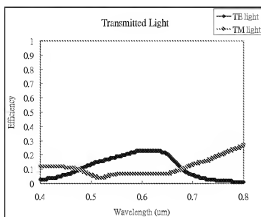
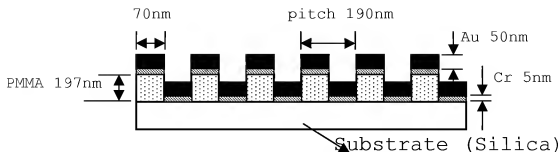


FIG.2: the relationship between wavelength and transmittance for TM and TE polarized lights for simulation of Yu et al's structure as a transmissive polarizer

NOTE: The above-simulation was performed by G-Solver Ver.4.2C (from Grating Solver Development Company) with the following parameters:



The Office Action alleges that the grating behavior of Yu et al in transmission is quite predictable. However, the simulation results of Fig. 2 indicate that Yu et al's structure exhibits low transmittance for both TE and TM lights. Accordingly, Yu et al's structure cannot function as a transmissive polarizer since there is no significant extinction ratio between transmitted TE and TM lights.

In view of the above, contrary to that alleged in the Office Action, Applicant submits that Yu et al fail to teach or suggest a transmission polarizer. Furthermore, as stated in the amendment filed November 4, 2005, the superior extinction ratio achieved by the claimed invention is unexpected. The vertical distance not greater than 100nm provides (1) unexpected high transmittance  $T_{TM}$  and (2) uniformly high extinction ratio over **full** visible spectrum. This is unexpected because the structure of Yu et al cannot provide a workable bandwidth for full visible spectrum even when acting as a reflective polarizer.

The Office Action alleges that smaller vertical spacings achieving higher transmittance and higher extinction ratios are not unexpected. In response, Applicant agrees that light traveling through a material will have better **efficiency** when the material is thinner. However, it *cannot* therefore conclude the transmitted light will have a higher **extinction ratio** (between TM and TE polarized lights). Note that the definition of extinction ratio is  $T_{TM}/T_{TE}$ , where  $T_{TM}$  is the transmittance of the TM polarized light and  $T_{TE}$  is the transmittance of the TE polarized light. A

higher transparency does not mean a higher extinction ratio. Moreover, a smaller vertical spacing do not necessarily represent a thinner material. To the contrary, according to the invention, it can be a smaller spacing between two *thicker* metal layers. It is apparent that the Office Action confuses the spacing with the thickness. Accordingly, the allegation that the advantages achieved by the invention is predictable is not reasonable.

For at least these reasons claims 1, 15, and 18 are novel and non-obvious over the cited references. Insofar as claims 2-14, 16-17, and 19-22 depend from claims 1, 15 and 18, respectively, it is Applicant's belief that these claims are also allowable at least by virtue of their dependency.

Claims 4, 5, 10, 11, and 21 stand rejected under 35 U.S.C 103(a) as being unpatentable over Yu et al (CLEO '99) in view of Garvin et al (U.S. Patent 4,289,381).

Claims 4, 5, 10, 11, and 21 ultimately depend from independent claims that include the aforementioned elements that is novel and non-obvious over the cited references, and thus these claims are also in condition for allowance for at least that reason.

Claims 3, 17, and 20 stand rejected under 35 U.S.C 103(a) as being unpatentable over Yu et al (CLEO '99) in view of J.J. Kuta et al (JOSA A).

Claims 3, 17, and 20 ultimately depend from independent claims that include the aforementioned elements that is novel and non-obvious over the cited references, and thus these claims are also in condition for allowance for at least that reason.

### CONCLUSION

In view of the foregoing, it is believed that all pending claims are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

No fee is believed to be due in connection with this amendment and response to Office Action. If, however, any fee is believed to be due, you are hereby authorized to charge any such fee to deposit account No. 20-0778.

Respectfully submitted,

By:



Daniel R. McClure  
Registration No. 38,962

**Thomas, Kayden, Horstemeyer & Risley, LLP**  
100 Galleria Pkwy, NW  
Suite 1750  
Atlanta, GA 30339  
770-933-9500